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Disease and the Epidemic: The Host, Parasite and Environmental Factors Concerned *

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Disease has been defined as existence at the limits of adaptation. This definition has always seemed to me a good one because it covers so many of the hazards to which we and our animals are exposed: adaptation to crowding, to a particular bacterium, virus or animal parasite; to housing and lack of exercise, to breeding and feeding for more meat, milk, wool or fur, and work, often without sufficient regard to, or at any rate knowledge of, the deeper physiological implications of our methods as distinct from their short-term effects. We have in the process of domestication protected our animals from many hazards, *e.g.*, starvation, climate and natural enemies, but we have exposed them to others. Capacity to adapt is a character of all living forms but it is normally slow. When we hasten the environmental changes we overtax or outrun completely the innate capacity of the individual for adjustment. Departure from health follows.

It is sometimes said that we should lesson our demands. To do so in any large measure would, however, be unacceptable to the animal owner and mean reduction of nutritional standards for man. Our present problem, greater than ever before, is to increase the output of our livestock supporting lands.

We have therefore to accept the results of the increasing demands made on the animal and to devise ways to combat their ill effects. To do so effectively we need to maintain a broad outlook on the nature of disease.

No disease has a single cause. In acute infective disease and in the individual this is less obvious than in the epidemic or in the chronic disease. But even here, nutrition, age, injury, to mention only a few of the factors, play a part. In the epidemic such factors as spatial distribution and its influence on dose and on the likelihood of effective contacts take a predominant role. In chronic diseases, like tuberculosis, nutrition and age are as important in deciding whether the infection develops its full pathogenic effects as is the tubercle bacillus, whilst in others, *e.g.*, intestinal infections of the young, dietary management may be all important. In all of these the role played by the resistance of the individual, natural or acquired, is at least equal to that of the infective agent. This decides the nature of a disease—it is no more important in controlling the occurrence of an active pathogenic state or its degree than are many other factors. (Ryle, 1942; Lovell, 1942, and others.)

In non-bacterial diseases, too, many factors may be concerned. I do not intend to say much on these diseases. A few examples will be sufficient. The best known example of a disease in which two well defined factors have clearly been shown to play a part is probably rickets. Here the disease may be caused by withholding either a proper supply of calcium or adequate vitamin A and the latter is itself dependent on sunlight acting on the precursors of vitamin A either in the body or elsewhere; and it can be cured by correcting the respective deficiency or deficiencies. Vitamin studies have also brought to light other interplays of factors of an interesting kind, *e.g.*, the fact that vitamin deficiency in a high plane of nutrition diet may be more serious than in a low plane diet. In another disease, anaemia, both iron and copper have been shown to be necessary to effect a cure; both in piglets and experimentally, in white rats (Elvehjem). If both are present in the diet all is well. If copper is deficient, production of red cells by the bone marrow is defective although iron may be in plentiful supply from current diet or liver storage. If iron is deficient, red cells are produced but are deficient in haemoglobin content. This form of anaemia provides also a good example of the demand on the mother being too great for her capacity to produce as the result of alterations in feeding and breeding brought about by domestication.

In human medicine the work of Minot and Murphy (1926) and of Castle (1929) provides a parallel, though here the two factors in human pernicious anaemia have been shown to be an extrinsic food factor and an intrinsic gastric factor.

Swayback provides another example of a disease in which more than one factor is involved. Copper deficiency is certainly one but it is not the whole story. In another disease in Australia—enzootic hepatitis—excess of copper causes liver damage unless a certain amount of molybdenum is also ingested.

Helminthiasis provides a striking example, from another field, of the combination of two factors, the worms and nutrition, and the interplay of the two is affected by management with its effects on crowding and ground infection.

Duodenal ulcers, to quote Ryle (1942), is another human condition which was once ascribed to a single factor, focal sepsis elsewhere, but is now coming to be considered as due to multiple factors, *viz.*, emotional or occupational stress, or tobacco addiction, in a person of heightened susceptibility due to age, sex, hereditary disposition, physical type or temperament. Psychological factors play a part in various conditions in man—the so-called psychosomatic group of diseases. It does not seem likely they play an equal part in animals but we have little information on this subject. Thought directed more towards multiple factors of other kinds might bring light on many animal diseases and it is a field in which the clinical observer could well give a lead.

Let us return to diseases associated with living agents and examine the factors concerned in more detail.

DISEASES ASSOCIATED WITH LIVING AGENTS

Diseases associated with living agents depend on factors affecting both the parasite and the host and are often materially influenced by predisposing or environmental factors. The relative importance of these factors or groups of factors varies in different diseases.

Disease in the Individual

The Parasite.—Different organisms vary in respect of the numbers needed to set up infection and this depends also on route of infection. Some are more virulent than others in terms of the clinical diseases caused. In the more acute diseases and in those in which small numbers are needed to infect or in which the organism multiplies readily, factors other than specific resistance are less important than in chronic diseases. They have less time to act and are overshadowed by the high virulence of the infection. Different organisms also vary in their ability to be spread quickly or widely—depending on the site of lesions, methods by which infection leaves the body and its amount, the route of entry into another host and their powers of survival or multiplication in the outside world.

Different strains of the same organism may also have different degrees of virulence and/or different degrees of invasiveness or power to spread to other hosts. These characters are different and dissociable. Another factor which has to be taken into account is the occurrence of different immunological types within the same species which provide no protection against one another.

Some organisms, *e.g.*, *B. bronchiseptica*, *Haemophilus* sp., rarely cause pathogenic effects unless the way is paved by other agents such as a virus. They then act as secondary invaders and may be responsible for the greater part of the symptoms and mortality. Such a virus may be of low pathogenicity *per se*. Some organisms may be able to set up local purulent conditions by themselves, *e.g.*, the group C. haemolytic streptococcus of the horse, *C. pyogenes* in the bovine, but can cause serious lesions in other organs, *e.g.*, the lung in these two cases, if another agent has prepared the way. And if such organisms are lying dormant in a herd an outbreak of disease may have all the appearance of being due entirely to the organisms whereas the fact that it has occurred at all is due to the virus.

The Host.—Many species have a natural and absolute immunity

* Presidential Address at the Annual General Meeting of the Central Veterinary Society held at the Royal Veterinary College, Camden Town, on October 16th, 1947. This address took the form of a paper introductory to the series of discussions on the general theme of preventive medicine in relation to veterinary work, which will be reproduced in forthcoming issues of *The Veterinary Record.*

to certain organisms, *e.g.*, the ox to glanders, presumably because there is something in the physico-chemical make up of their cells which prevents infection. Racial immunity may also be of the same order, *e.g.*, the negro to yellow fever. The resistance of zebu cattle to piroplasmosis is another example, though here it may be broken down under stress. In both these cases it is independent of any previous exposure, but is particular in kind, *i.e.*, it is towards certain organisms, not to others and is something apart from the general constitutional resistance shown by certain individuals.

Several workers have shown that it is possible by selective breeding to produce strains of fowls or of laboratory animals which are usually susceptible, or resistant to particular bacteria or viruses. It has also been shown that resistance to one bacterium or virus does not necessarily go hand in hand with resistance to another (Gowen and Schott (1933)—Silver and "S" strains of mice with *Bact. typhimurium* and pseudo-rabies; Webster (1933)—strains bred from survivors of *Bact. enteriditis* infections were also more resistant to pasteurella, pneumococcus and Friedländer bacillus but not to the virus of louping ill). In plants even finer differences have been shown, *e.g.*, strains of wheat have been produced which are resistant to one strain of rust but not to another. An interesting example of linked factors is the resistance to Rous sarcoma of a strain of fowls selected for non-broodiness.

Breed or strain differences of susceptibility are often postulated amongst domesticated animals, *e.g.*, the Jersey to Johne's disease, certain strains or families to mastitis. Data in regard to family or strain differences are hard to get and analyse. It is a matter, however, deserving of further study.

The resistance acquired by previous infection is one of the most potent influences on the outcome of further exposure. It may be of high and of long duration as in rinderpest or dog distemper and most other virus infections, and in a rather less degree in, *e.g.*, brucella infection. It may be shorter but of substantial character as in foot-and-mouth disease. It may be very short as in the influenzas and common cold or it may never reach a practical level as in the streptococcus infections of the udder. It may be kept up only by repeated exposure.

Another factor, less important to the individual than the community or herd, but which plays some part in determining whether a disease becomes endemic or epidemic, is the prevalence and persistence of the carrier state. For a disease to continue endemically the causal organisms must not kill all the hosts or even a majority. Disease of high infectivity and low killing power will become endemic. Endemicity depends on the balance between community resistance and parasitic activity.

Other factors affecting the resistance of the host may be of a non-specific nature.

The Plane of Nutrition.—Low nutrition, *e.g.*, in tuberculosis and by *generally* depressing resistance in many diseases, *e.g.*, in famine conditions. Other factors may of course play a part in famine conditions; lice, *e.g.*, become prevalent. Defective nutrition in the sense of over-feeding, *e.g.*, in calf scours. Sudden change to better feeding is often a trigger factor in pulpy kidney disease in lambs. Good nutrition is also necessary before guinea-pigs will show satisfactory lesions following infection with the virus of foot-and-mouth disease and the same is true of cattle. Parasitic worm infection of course provides the best example of the interreacting effects of parasite and nutrition.

Special defects, *e.g.*, of vitamin A, are believed to reduce resistance to secondary infection by reducing the effectiveness of the epithelial barrier—Xetophthalmia in rats is the only well-established example that occurs to me. Subnormal intakes of ascorbic acid are believed by some to reduce general resistance. One curious example of a defect in diet is the effect of lack of phosphorus in leading animals in S. Africa to consume the bones of decayed carcases and so kill themselves with botulinus toxin. The presence of *Cl. botulinum*, of uncollected decayed carcases and of phosphorus deficiency are all necessary if the disease is to occur.

Increasing age usually increases resistance, *e.g.*, cattle to Johne's disease, pigs to paratyphoid infection, chicks to B.W.D., lamb dysentery and diseases of the young in general.

In brucellosis, however, calves are less susceptible than adults, presumably because the genital organs and udder are not yet matured.

Temperature.—Cold increases susceptibility to most respiratory diseases, to mammary inflammation and probably to many diseases, particularly of the young. Heat may also cause a latent infection to become clinical as, *e.g.*, herpes simplex in the human.

Trauma clearly plays a part in many anaerobic infections and in mastitis—increasing local tissue susceptibility. It may also, if it leads to a break in the epithelial protection, allow ingress of an infective agent.

Season in summer mastitis in the bovine is obviously important.

Degree of function also plays a part.

General environmental factors other than those above also influence the relations of parasite and host, *e.g.*, crowding may greatly increase the chances of an animal becoming infected, whilst movement from or to an infected farm or area will expose it or its new neighbours to contact and, if it or they have had no previous exposure, to risk of serious disease.

Vectors are also much influenced by climatic and environmental influences and the latter therefore play the predominant role in some diseases.

These general environmental factors are, however, better considered in regard to the epidemic.

The Epidemic

We have seen that in the individual there are a large number of factors which take part in the genesis of disease. In the herd the factors which decide whether an epidemic will take place are even more numerous. Epidemics, both small and large, depend on a disturbance of the equilibrium between parasite, host and environment. They are the result of a quantitative change between the amount of resistance of the host (its relative degree of immunity) and the dosage of the infection (the parasite). They thus depend on the previous experience of the host and on environmental factors influencing the multiplication of the parasite, its vector (if any) or the means by which the host is affected. The likelihood of an epidemic is often quite predictable; as Gill put it "An epidemic is the culminating point in a series of events which follow in ordered sequence and lead inevitably to an explosion."

The Intensity of an epidemic depends on the degree of disturbance of the equilibrium and the amount of resistance built up in previous epidemics. This in turn depends on the time since that occurred, *its* intensity, and the duration of the average resistance in the particular disease concerned. Thus, it is impossible to get an intensive epidemic of contagious brucella abortion in a herd which has suffered a severe outbreak a year or two earlier. A minor epidemic may occur amongst newly introduced stock or heifers and some cases may occur in older animals, either because they escaped all infection earlier or, if they were infected earlier, are exposed to a massive dose. It is also milder in a vaccinated herd, because even if an individual animal should be exposed and succumb to massive infection because of the size of the dose or because it failed to become immunized, the remainder of the stock or the greater part will be sufficiently resistant to prevent multiplication of infection altogether or to restrain it in such way that subsequent excretion of infection is small. The position is quite different in a herd which has neither been immunised artificially nor exposed to a previous epidemic, and an outbreak of great intensity may follow. The first animal exposed either aborts, calves prematurely or, if parturition is normal, excretes brucella in its discharges. Because all animals are susceptible to small doses, others become infected, some at least abort and spread infection widely before any sanitary precautions can be taken, infection is multiplied many times, and an intense outbreak follows. For some years following this an outbreak of the same intensity cannot occur again. I have chosen an example well known to all in this country and one which brings in most of the factors concerned in any directly spread disease. Foot-and-mouth disease would have provided an equally good example in which events move much faster. In rinderpest or dog distemper events also move fast but are influenced by the strong and lasting immunity which characterises these diseases.

The intensity of an outbreak will also be affected by the ways in which infection is distributed from an infected animal, its amount and its resistance to external factors, and by the method by which it reaches its new host. Diseases in which infection is direct and by a narrow channel, *e.g.*, bovine mastitis, do not normally spread rapidly. Infections in which excretion and infection are by the respiratory route usually spread quickly and widely. Those in which large amounts of infective material are released and in which the infective dose is small, *e.g.*, foot-and-mouth disease, distemper, rinderpest, swine fever, likewise spread rapidly, and if the resistance to outside influence is considerable may quickly be spread widely by indirect means. Diseases, on the other hand, in which the host dies before it excretes much infection or in which infection is rarely excreted are the slowest spreaders, *e.g.*, anthrax, black-leg. In the latter case infection cannot spread until the carcase has disintegrated and then is so limited in extent that it is unlikely to pass to many animals at any one time. Areas may in time, however, become heavily infected. The resistance of this and like organisms is, however, such that infection remains for long periods of years so that the disease often assumes an endemic character.

Another factor of high importance is the degree of crowding because it decides the frequency of effective contacts. It is

common knowledge that when large numbers of young and therefore susceptible horses are brought together, as for example in remount depots, the likelihood of outbreaks of respiratory disease is great. Quick distribution from such collecting centres is essential. Similarly in schools it has been shown that the incidence of nasopharyngeal infection takes a sharp rise within the first few weeks of each term.

The wideness of an epidemic depends to a considerable extent on the factors already mentioned, but movement and interference with ordinary sanitary precautions play a predominant part (see du Toit (1938) *re* war and animal epidemics). Thus many of the great human pandemics of the past have followed the movement of armies and chaos they produce. In the first World War, rinderpest spread far westward into the Balkans and Spain. Similarly in the last war, there was spread of many diseases and one disease, dourine, was introduced into France where it had not been present for many years. Movement of the living animal, too, is not the only hazard as exemplified by the recent outbreak of Newcastle disease which after a period of absence of 17 years, was undoubtedly reintroduced to this country by the importation of undressed fowl carcases from Central Europe, still living virus being introduced into the flocks by way of carcase refuse. The importation of a large number of new types of salmonella in dried egg to man, poultry and pigs is another example. Another factor was instrumental in the two latter cases, *viz.*, owing to shortage of feeding-stuffs garbage was fed to poultry on a scale not known before. It is evident that if our sources of supply of meat are limited by monetary considerations we may be hard put to find sources of supply free from danger.

Experimental Epidemiology in Mice

Whilst much can be learnt from observation of outbreaks in the field, the various factors are often not controllable in such a way as to make it easy to dissociate them, and by introducing what was virtually a new technique of experimental investigation—and it is new techniques which lie at the basis of all great advances in science—the late Professor Topley with his colleagues (Topley (1942) to which is appended a list of earlier publications and also references to similar work by Webster) produced some results of extraordinary interest and importance. They studied under controlled conditions the spread of infection in herds of mice. The diseases were mouse typhoid (spread by faeces), pasteurellosis (spread by the respiratory route) and ectromelia (a virus disease), all natural diseases of mice.

In one of their earlier experiments they tested the effect of varying rates of addition of normal mice to an infected herd. With a low rate of addition there were wide fluctuations in the intensity of the resultant epidemic, with some intermissions. As the rate of additions increased the intermissions disappeared, mortality rose, and after a period of some fluctuation, settled. There then appeared to be no inherent tendency to fluctuation, *i.e.*, no evidence that the parasite alters its properties or that hosts show any general periodic resistance. In another experiment they tried the effects of continuous and discontinuous contact. When normal mice were put in contact with an infected herd for four hours three times a week, there was an initial moderate outbreak but deaths soon ceased. Continuous contact was then tried and deaths rose steeply almost at once. Reversion to discontinuous contact brought the death-rate down sharply but the epidemic kept on at a low level. After this had gone on for 15 months without any important alteration, continuous contact was again put into operation and another sharp rise again followed. The experiment shows the marked consequence of an alteration in a single factor, frequency or amount of contact. In yet another experiment they tested the effect of dispersal. The dispersal of groups of 100 mice into groups of 25 had no effect. Breaking down into groups of ten had, however, a marked effect in reducing mortality, provided the epidemic had not got going too thoroughly; then it was of little avail. Dispersal into single cages, however, always decreased mortality markedly. This provides useful confirmation of the soundness of the advice to keep young calves singly or in small groups and in fact always to disperse when confronted by conditions likely to lead to an epidemic. Group to group infection was also tested by exposing normal mice to infected mice for four to 21 days and then placing the normal mice with other normal mice and so on as long as deaths occurred. Neither mouse typhoid nor pasteurella disease could be so taken to more than three generations. With longer contact it might have succeeded but the experiment shows again the importance of those factors which determine effective contacts.

In other herd experiments it was shown that whilst introduction of ectromelia into a susceptible herd of mice was marked by a high initial death-rate followed by high herd immunity, mouse typhoid was characterised by a moderate initial death-rate and only moderate subsequent herd immunity, and that these phenomena were reflected by the much higher value of ectromelia vaccines in increasing the expectation of life of introduced mice.

These experiments as a whole show how in a susceptible population, and apart from any new introduction of infection, movement of normal and infected and dispersal or aggregation can be sufficient to account for major alterations in the incidence of an infectious disease, and how these factors together with the degree of immunity in the population as a whole are sufficient to account for the periodic fluctuations observed under natural conditions.

Reference is often made to strains of increased infectiousness with the implied belief that during an epidemic the current strain becomes exalted or gathers infectiousness by passage from animal to animal. It is obviously possible and strains of high spreading power do occur. They may or may not be highly virulent. Topley and his co-workers sought to find if virulent variants arose in the course of their mouse epidemics but found that in only two instances in 20 years did they get any evidence suggesting that it had occurred. Webster (1923 to 1927) in America had much the same findings and Topley (1942) concludes that it seems likely the evolution within any parasitic species of a strain of high epidemicity is an occasional event rather than part of a normal or periodic process.

It is of course well known that by passage in a species other than the original species, as Crawford (1947) puts it neatly "needle passage," the virulence of an organism may be increased for that species and, as in the classical experiments of Pasteur with rabies or of Edwards with rinderpest, lowered for another species, or that passage in a particular tissue may be the means of altering the tropism of a virus so that it loses its original characters and may be made a safe means of immunisation (horse-sickness, yellow fever). The alteration here is apparently, however, as Crawford says, to render the organism more virulent when injected by a particular route or to make it inefficient in developing its pantropic properties or in gaining entry to a new host by natural means. These findings do not, however, suggest that variations occur often or rapidly under natural conditions. It seems that the manifestations of epidemics as they occur can usually be explained on other grounds.

Animal Vectors

So far I have referred only to diseases which are spread directly from host to host (or indirectly through inanimate means). The story becomes more complicated in diseases which are spread by animate hosts, *e.g.*, fleas, rats, biting fleas and ticks, and even more so when the parasite (as the nagana parasite) has to go through one stage of the development in that other host.

Here the important factors are not only the parasite, the immunity of the human or animal host, and its spatial distribution, but the presence and distribution of intermediate hosts, and these are influenced by all sorts of climatic factors. The question becomes one, not of mere contacts between infected and susceptible hosts, but of effective contacts and these are dependent on the distribution of the vectors, their breeding and feeding habits and powers of movement. Plague is largely a matter of fleas, typhus of lice, leptospirosis of rats, louping ill and red water of ticks. There is good reason for supposing that the continued absence of plague is dependent at least as much on general improvement in living conditions and its effects on fleas as on any quarantine measures, whilst experience in prisoner-of-war internment camps has shown how quickly typhus spreads if lice become prevalent.

The part played by a vector is even more sharply brought out where the parasite has to pass part of its life cycle in the intermediate vector. To take trypanosomiasis of cattle in Africa or nagana as an example, an infected animal has to be bitten by the appropriate fly when the parasites are at the right stage of development in the peripheral blood and that fly has been to bite another animal, a susceptible one, at the appropriate time, *i.e.*, when the parasite has completed its cycle in the tsetse fly. The dependence of the liver fluke on the particular variety of snail that is its intermediate host provides another example.

Control or eradication of diseases in which an intermediate host is concerned becomes thus equally as much a study of the ecology of the vector, its breeding habits, powers of migration and general bionomics and the ways of controlling them, as of treatment or sanitary measures in the host.

I have made no reference to methods of producing immunity because it would lead us too far afield. Two aspects, however, should be mentioned. If a living product is used to produce immunity, though quite free from danger in its original form, *e.g.*, a bacterium or virus modified in virulence by artificial means or by passage in a species other than the main host, it may either cause serious disease and sources of infection in that other species or mutate to the original form in the main host species, and so in itself provide sources of new infection to susceptible animals.

(*Concluded at foot of col.* 1, *p.* 316).

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THE SALE AND USE OF PENICILLIN

THE widespread appreciation of the value of penicillin in the treatment and control of common streptococcal mastitis in cattle has raised a difficult question. Many practitioners are receiving requests from their clients to leave a supply with them, to make provision for the immediate treatment of new cases or to be used for control purposes. Now that suitable penicillin preparations are available in tubes, and the antibiotic more simple and more safe of administration, these requests have an added cogency. Is it possible for the profession to adopt a consistent attitude towards the supply and use of penicillin ?

The placing of the Penicillin Act on the Statute book was justified, very largely, by the need to conserve supplies and by the fear that its indiscriminate use might lead to the creation of resistant strains of organisms. The Act restricts the agricultural use of penicillin to the veterinary surgeon or to a person acting in accordance with his directions, and the dispensing of it to a veterinary surgeon or a registered pharmacist acting upon a professional prescription, signed and dated.

Some, influenced perhaps by ethical considerations or by the sight of boxes of penicillin tubes left lying about on the window ledges of cowsheds, might wish to read into the wording of the Act the inference that on no account should a penicillin preparation be left for the farmer to administer himself. Some might go to the other extreme and take the view that penicillin may be freely supplied to the client. In the absence of decisions by the Courts, the exact legal interpretation of the provision that penicillin may be used by "a person acting in accordance with the directions" of a veterinary surgeon must remain somewhat arbitrary. It does seem possible that it cannot be contended that penicillin must, in all circumstances, be applied only by the veterinary surgeon. Should it be deemed proper to leave it to be administered by the client, explicit directions must be given, possibly with some warning against illegal use. Circumstances vary so much with cases that much must be left to the good judgment of the practitioner who will not wish to lay himself open to the charge of having adopted an unnecessary restrictive practice. On the other hand, he will wish to play his part in avoiding misuse of this valuable instrument and in seeing that the law is observed.

The helpful attitude of the Pharmaceutical Society is well illustrated by their editorial reprinted in this issue of *The Veterinary Record*. The Act charges the Society with the duty of seeing its provisions observed. They have made a generous response to the intimation of complaints already received by the Association. They recently prosecuted one of their members for having illegally sold penicillin. Veterinary surgeons who meet instances of breach of the Act can be assured that their notification of them to the Association will lead to active and satisfactory action.

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VETERINARY PENICILLIN

In its issue of June 12th, *The Pharmaceutical Journal* observes: "The requirements of the Penicillin Act, 1947, in respect of the supply of penicillin ointment to farmers focuses attention upon what appears to be a conflict between the safeguard applied by statutory requirements, the demand arising from the increased usage of penicillin preparations for veterinary purposes, and the customs of veterinary practice. It seems that the issue of a prescription to the owners of patients is not so customary with veterinary practitioners as is its parallel with medical practitioners; usually the animals are treated by the veterinary practitioner and not by placing the necessary drugs in the hands of the farmer. To this extent the requirements of the Penicillin Act are not quite in line with veterinary practice and farmers are loath to pay fees for treatment when the drug, which in their opinion is indicated, is available to them once they get a prescription. This attitude arises in the convenience and ease with which penicillin ointment supplied in collapsible tubes can be administered.

"On the other hand the veterinary practitioner—quite properly in our opinion—is not prepared to issue prescriptions for such a substance unless he has control of administration and is even less inclined to do so if he has no opportunity of examining the animal for diagnosis. Bovine mastitis, for which this treatment is given, requires the experienced diagnosis and treatment of a veterinary practitioner—for various reasons, not the least is that tuberculosis of the udder may be detected if it is present. There are also various types of mastitis which require different treatment.

"The safeguards applied by the Act are therefore necessary and the pharmacist should not be persuaded to encourage the medication by farmers of their cattle in treating diseases of this description. The 'trade or business' relaxation permitted under the Pharmacy and Poisons Act, 1933, which has been interpreted in a manner that permits the treatment of cattle with sulphonamides by farmers, is to be regretted for similar reasons, and it certainly does not provide any grounds for advocating a more lax distribution of penicillin. The Society has taken all possible steps to ensure that farmers are fully informed through the medium of their trade journals as to the legal requirements governing this situation and pharmacists are liable to heavy penalties in breach of these requirements. The Penicillin Act, 1947, is one which, while applying statutory control to the distribution of penicillin, does not impose upon pharmacists cumbersome obligations as to the keeping of records and prescriptions. It was left intentionally so on the grounds that the distribution, being in the hands of qualified persons, was safeguarded from abuse. We must not allow this rather enlightened recognition of the pharmacist as a responsible person to be undermined by the insistence of the farmers' demand for supplies of penicillin."

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PENICILLIN—A PROSECUTION

(Chemist and Druggist, June 12th, 1948, p. 755)

At the Newcastle, Staffs., County Magistrates' Court on June 7th, John Henry McEllin, M.P.S., Church Street, Audley, was summoned for selling penicillin lozenges not under authority of

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Secondly, a satisfactory immunising agent—even if dead and free from the above dangers—may so alter the general picture of a disease as to mask infections, which may again be a source of danger to susceptible animals. Thus, whilst preventing an epidemic, vaccines may in one way or another lead to a continued endemic situation which, though not in itself serious, makes continuation of immunisation necessary and necessitates a constant watch for infection in neighbouring areas or those to which animals are exported. A recent example of such an occurrence is the importation of rinderpest into Malta. In this and other diseases animals may have incubation periods beyond the ordinary, or infection in naturally resistant stock may show very slight symptoms, *e.g.*, foot-and-mouth disease into Mexico recently. The danger is that in a place or country where a disease is unknown, early cases may be overlooked or, because of strangeness, not be recognised and dealt with for what they are until chance of further spread has occurred. We, here in Britain have now, more than ever since meat may have to come from unusual sources, to be on our guard for happenings such as this and the practitioner might be the first to be faced with a questionable case.

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Southport

An old town glories mostly in what it was, a new town boasts of what it is. There is, however, justifiable pride in an acclaimed "Seaside Garden City" which has risen in a hundred years from a wilderness of sand. Yet, new as it is, Southport has a worthy record in antiquity, chiefly concerned with the parishes which, in its lusty growth, it has absorbed.

In the tenth century, the tithes were collected by the monks of Lancaster, and in late Saxon times there was founded the Church of St. Cuthbert, nearby Meols Hall, later recorded in the Domesday Book. In the reign of Rufus (William II), the patronage of the Church was vested in the Abbey of Evesham by the Priory of Penwortham. To-day, St. Cuthbert's Church at Churchtown, a district of Southport, is still the Parish Church, and the County Borough remains officially in the Parish of North Meols. At the period of the Reformation, inside the surrounding sandhills, far off the beaten track on the banks of a then inland lake "Martin Mere," the persecuted Recusants found sanctuary.

In 1797 the Lord of the Manor resident at Meols Hall became High Sheriff of the County of Lancaster. About this time south of the Hall, in an oasis amid the sandhills on the banks of a stream, an inn-keeper erected a "Canteen," built out of wreckage found on the coast for the convenience of patrons who liked to be transported to the beach in his bathing carts. These were said to be the gentry of Wigan and other places served by the Leeds and Liverpool canal. The immediate success of his enterprise prompted him to convert it into a permanent hotel in the following year, and at the enthusiastic house-warming a doctor, Miles Barton, christened the new building the "South Port" hotel. During the Bacchanalian revels news came through of Nelson's victory at the Nile, whereon the convivial party went forth to the nearby stream and formally gave it the name of "Nile": though later, when town sewerage drained away the river completely, the villas in the neighbourhood received names appropriate, some of which are perpetuated in the houses of to-day.

This locality, one of eight or nine hamlets comprising the Parish of North Meols, had previously been called "South Haws." The doctor's wit, however, supervened and Southport was born.

In 1809 there were 38 houses with 100 inhabitants. The embryo town sprawled out until 1825 when the prototypes of the modern planners obtained the first Act of Parliament providing for the laying-out of the growing community. These planners were the then joint Lords of the Manor and included in their plans was "Lords Street," a thoroughfare to be 88 yards wide. Whether the merit belongs to planning or the wisdom of the planners may be the basis of argument, but the result (now Lord Street) is one of the finest thoroughfares in the British Isles. The wide footpaths with continuous verandas in front of the shops lining one side, the six line silent roadway of wooden blocks and the boulevards, trees, public and private gardens on the opposite side, combine to make shopping, promenading or merely idling, comfortable and pleasant at all times in all weathers.

About ten years after the foundation of Lord Street, the Promenade, primarily as a breakwater, commenced to take form. Affronted by this restriction on its activities the sea commenced to retire from the town. Relentlessly the town pursued it. Two pools left at low water were made into two lakes, later to be joined into one and this Marine Lake is still filled and washed by the high tides. A pier was pushed out a mile and a quarter into the sea, and for the benefit of the less athletic,

Marine Lake.

first a cable, and then an electric, tramway conveyed passengers for the first two-thirds of the journey. In recent years the pier has been shortened following a disastrous fire at the pier head, but still remains one of the longest in the country.

The Promenade was widened and gardens were developed, until now the King's and Floral Hall gardens extend for three-quarters of the length of the Marine Lake on the land side. Here dance bands and concert parties perform in the open-air almost all day, amid areas set out for flowers, putting greens, tennis courts and bowling greens. On the lake itself rowing boats, motor-boats and yachts are on hire. At the south end of the lake is the Pleasureland where all the thrills and excitements, "cyclone coasters," "dive bombers," and other features of the Coney Island type abound. Along the lake runs the Miniature Railway and beyond the Prince's Park. Here is a large modern Sea Bathing Lake, a "Children's Playtime" Show, model yacht pond, children's playground, and a nursery where visitors may leave young children for the day. Enclosing these is the Marine Drive, beyond which are the golden sands, stretching for many miles, so firm and safe that on them in 1926 Major H. O. D. Seagrave established the then world's land speed record of 152 miles per hour in a 33 h.p. Sunbeam car. Driving and parking cars are permitted on the foreshore which provides excellent facilities for picnics, sunbathing and beach parties, though the unwary who park and go away may be mortified on their return to find their cars under the sea. Flanking this Marine Drive at one end aeroplanes ply for hire on pleasure trips or as taxis, while at the other end stands Peter Pan's Pool, where all the fun of the fair in safe and suitable form for children is provided. Here "Nana," a young but motherly St. Bernard, has her home, but at present has children of her own so has

Municipal Gardens.

a prescription. For the Pharmaceutical Society, who prosecuted, it was stated that an inspector sent a woman agent into the Defendant's branch shop at Bignall End to ask for, among other drugs, a bottle of penicillin tablets. Defendant, a qualified chemist, was not in the shop at the time and the agent was served by a woman assistant. For the defence it was urged that the defendant was fully conversant with the Penicillin Act, and that the offence was due to an honest mistake being made during a renewal of stock. The Bench imposed a fine of £14. (*Chemist and Druggist, June 12th*, 1948).

little time to devote to her duties to human children immortalised by Barrie.

A wit once described Southport as full of shrimps, spires and spinsters. A later one might have added railway stations. In 1939 there were 17 railway stations, and though three have closed during or since the war, 14 is no mean number for a town to boast, and being mostly served by electric trains provide almost a tube service above ground. The shrimps have been largely replaced by flowers, and though in these austerity days the display is not so lavish as it once was, many visitors still regard the town as an all-the-year-round flower show. The annual Flower Show, within a few years of its inception became recognised as the World's Largest Summer Horticultural Exhibition. What Southport does, it does well.

Two of the parks, Hesketh Park and the Botanic Gardens, each with small lakes, are largely natural, and serve to provide residents and visitors with country walks within the town. Victoria Park, though partly ornamental, serves to provide courts for tennis and the ground on which the Flower Show, Horse and Agricultural Shows and International Tennis Tournaments are held. Other parks are chiefly devoted to recreational purposes.

A number of important political personages have thought Southport worth a visit for both business and pleasure. Mr. Winston Churchill and Mr. Ramsay McDonald, apart from addressing meetings, spent private holidays here, and it is believed that it was while walking on the Promenade that Mr. Churchill's hats first came to the public notice. W. E. Gladstone first announced his proposal to dis-establish the Irish Church, Richard Cobden propounded his Free Trade, A. J. Balfour and H. H. Asquith came here to state their policies. G. M. Curzon was appointed Viceroy of India while sitting as the local M.P., and the present member, Mr. R. S. Hudson, was Minister of Agriculture in the Coalition Government. A memorable election was when Mr. J. M. Astbury, K.C. (later Lord Justice Astbury), defeated Mr. (later Sir) Edward Marshall Hall, K.C., by a mere 240 votes.

As a conference town Southport is more and more favoured by all kinds of associations and societies. A Conservative stronghold, it is held in great esteem by the Labour Party. Whatever their creeds, doctrines or isms, Southport welcomes them all, and with its soothing air and calm serenity, hopes and believes they go away wiser, happier and healthier than when they came. May I hope a record number of veterinarians will this year receive these blessings. H. Raynor Hewetson.

CLINICAL COMMUNICATION

Tuberculosis in the Dog

P. LIVINGSTON BUILDER, M.R.C.V.S.,
Edgware

Subject.—Cross-bred terrier, male, age seven years.

History.—Vomiting and inappetence for three weeks, during which time the animal had been treated by a clinic for "gastric trouble."

Examination.—Bodily condition was good. There was a slight uraemic odour, otherwise symptoms were lacking. A blood sample was taken for agglutination *versus Leptospira* spp. Urine, albumen +++.

Treatment and Course.—In accordance with a tentative diagnosis of leptospirosis, penicillin therapy was commenced (1 c.c. of ol. arachis suspension *b.i.d.* intramuscularly), a diuretic mixture was prescribed, and advice was given regarding diet.

The animal became rapidly dehydrated, and in 72 hours glucose/saline *b.i.d.* was commenced, together with coramine every two hours per os. The urine still showed a high albumen content, and blood was also present in visible quantity. This treatment caused a slight improvement, but at this stage respiratory symptoms commenced to predominate. Respirations were painful and exaggerated, and pain was evinced over the posterior part of the chest wall. Percussion and auscultation revealed an area of dullness extending over the posterior lower third of the chest, suggesting pleural effusion. Paracentesis thoracis yielded about 14 dr. of straw-coloured fluid containing flocculi. Tuberculosis was suspected, and a subcutaneous tuberculin test carried out. This was positive, 1 c.c. of dilute tuberculin subcutaneously giving a temperature rise of 4° F. in one hour. The animal was destroyed.

Post-mortem Examination.—Gross tubercles were present in both lungs. "Grapes" were present on the central part of the diaphragm. There were a few nodules underlying the parietal pleura.

Comment.—It appears that the dog had spent the first five years of its life in a tuberculous family, its previous owner having died from tuberculosis. It had been with its present owners for a little over two years, and no history of tuberculosis was forthcoming in this latter family, neither did radiographs of this family taken subsequent to the dog's death reveal any lesions.

The case is reported owing to the strong suggestion that infection had occurred some two years before symptoms appeared; it is usually accepted that tuberculosis runs a comparatively acute course in the dog and the existence of a quiescent or sealed lesion cannot be assumed to occur. It is rarely possible to correlate the probable time of infection with that of commencement of symptoms as in this case. The result of the agglutination test suggests that an *L. canicola* infection (probably sub-clinical) had occurred at some time during the preceding six months, and it may not be unreasonable to postulate this intermittent infection as being the factor causing the tuberculous infection to flare up and run the typical acute course.

Result of Agglutination Test.

Leptospira canicola positive at 1 : 300
negative at 1 : 1,000
L. icterohaemorrhagiae positive at ± 1 : 10
negative at 1 : 30

ABSTRACTS

[Transport, Handling and Lairage of Animals Intended for Slaughter. Allen, C. G. (1948.) *J. Roy. San. Inst.* **68**. 108-113.]

In a Benjamin Ward Richardson lecture the Chief Veterinary Officer, Birmingham, refers to the regulations governing the operating of collecting centres, road, railway and sea transport and abattoir lairages. He is in general agreement with these regulations, though he advocates additional veterinary supervision at collecting centres, in order to prevent transport of such animals as are not fit, with special reference to newborn calves, which also require special consideration with regard to road transport and lairage. They should usually be permitted to travel only in the lower deck of two-deck lorries. The use of goads should be regulated and it is advised that an approved type of electric goad should be made available for general use. There is still need for more large abattoirs of a size suitable for employment of a full-time veterinarian, and provision for horse slaughtering as a routine measure should be made at abattoirs.

The sale of day-old chicks and their transport should be regulated with humane considerations in view. I. E.

* * * * *

[Experiments on Infection of Cows with Typhoid Bacilli. Scott, W. M., and Minett, F. C. (1947.) *J. Hyg.* **45**. 159-168. (11 refs.).]

The experiments were designed to determine whether bovines can be infected with *B. typhosum* and whether they can excrete these organisms in the milk as a result of infection with it. The authors found that a cow orally infected twice with about 200 × 10^9 virulent organisms failed to excrete them in faeces and milk. One of two calves dosed with organisms in milk became infected. Both passed the organisms in the faeces for two days.

When more than 10^9 organisms were instilled into the udder, excretion of the bacilli in the milk ceased within ten days in 14/16 quarters. In the remaining two quarters excretion continued for 25 and 27 days while it continued for at least 85 days in two quarters of another cow. When large numbers of bacilli were applied to the teat orifice of 12 cows, the organisms could not be found in the milk or were found for one day only in eleven cows. In the remaining cow the organisms were excreted intermittently for seven days.

The authors conclude that these experiments do not support the view that milk-borne typhoid outbreaks are brought about by active infection of the cow. The likelihood is stressed of rapid increase in the number of typhoid bacilli gaining entrance into milk from extraneous sources. A. W. G.

Weekly Wisdom

Break the bonds which shackle the human spirit, enlarge the bounds of human reason and freedom, enquire freely into all matters of knowledge, follow the argument whithersoever it may lead: such is the great adventure of civilisation, and of its teaching and research laboratory—the university. Create an open world and open conditions for the free movement of life and thought and speech. Pull down obstructions and curtains, and let the lifeblood of human intercourse circulate freely for the benefit of all: such is creative freedom.—General Smuts (*Installation Address as Chancellor of the University of Cambridge*).

Questions and Answers

Answers to readers' queries represent exclusively the personal opinions of the writers, and criticism of the replies will be appreciated.

All communications should be addressed to the Editor.

"Loin Fall" After Milk Fever

Q. CCXLV.—*Is there any connection between "loin fall" in cattle following delayed treatment in cases of milk fever, and a depletion of the phosphatic reserves of the skeleton? If so, what form of medication would you recommend?*

[Our correspondent adds: "I should perhaps amplify this by saying that in our experience in this practice, when treatment for calcium deficiency is not given fairly soon after the animal goes down, one tends to get a higher proportion of cases of 'loin fall.'

"I use this term here in preference to anterior crural paralysis, because I understand that in the human at least, depletion of skeletal phosphatic reserves causes pain, particularly in the pelvic region. Clinically it appears difficult to exclude the possibility of a painful condition of the bones playing some part in this affection.

"I regret that I am not at the moment in a position to test this theory practically, and would, therefore, be glad to know whether anything on these lines has already been tried.]

A.—There does appear to be a definite connection between hypophosphataemia and "loin fall" and some other recumbencies whether or not associated with milk fever.

Biochemical examination of a limited number of blood samples from appropriate cases appears to confirm this opinion.

Where suspected, the addition of 1 oz. of acid sodium phosphate to the usual intravenous injection of calcium borogluconate (made up to a minimum of 350 c.c.) has proved useful, or 3 oz. of acid sodium phosphate per os every eight hours.

Mr. John Barker, of Hereford, has dealt with this problem in his talks to divisions on "the recumbent cow" and makes the above recommendations.

. . . . .

"Oedema of the Bowel" in Pigs

Q. CCXLVI.—*Can you give me any information regarding "oedema of the bowel" in pigs?*

A.—"Oedema of the bowel" is a specific disease of pigs and is particularly common in those recently weaned, usually affecting the best pigs of good litters. Its incidence appears to have increased during recent years and in the opinion of the writer this is due to improper feeding and is further evidence of a possible dietetic origin. The symptoms of the disease are staggery gait, oedema of the eye-lids, giddiness or inability to rise; these being followed by death within 24 hours. Frequently death is so sudden that no symptoms are seen by the attendant.

Post-mortem examination usually reveals thickening of the stomach walls due to oedema or more frequently gelatinous-like oedema in the folds of the colonic mesentery. If *post-mortem* examination is delayed the only findings are excessive fluid in the peritoneal cavity due to liberation of the oedema. In most cases the stomach is distended with food. Temporary starvation, administration of a purgative and subsequent feeding with a more easily digested food usually prevents further cases of the disease. It has been suggested that the disease is a type of anaphylaxis but in the writer's experience neither adrenaline nor benadryl is of use in treatment.

. . . .

Hand-rearing of Puppies and Kittens

Q. CCXLVII.—*Would you please give in detail a method for the hand-rearing of puppies and kittens from birth in the absence of a foster mother?*

A.—The hand-rearing of puppies or kittens is an arduous task and means the almost whole-time attention of one person for three, and possibly four, weeks, night and day. It follows, therefore, that the pros and cons of the situation should be most carefully weighed up before embarking on such an undertaking. In the case of a large litter of puppies a decision should be taken at the outset as to the desirability of reducing the numbers in order that the whelps which it is most desired to rear may have undivided attention.

If the pups are to be reared actually from birth, without any attention from the dam at all, it will first be necessary to dry the puppies, using fresh wads of cotton wool to rub them dry; a brisk, firm but gentle touch is necessary. During this proceeding the anal region of the pups should be vigorously massaged to stimulate the passage of the meconium. After thorough drying the pups should be placed in a basket sufficiently large to accommodate them comfortably, but not so large that any of the pups can get so far away from the general huddle that they become chilled. They should be placed on soft blanket under which are one or more hot-water bottles filled to give a heat of about 50° F.; these bottles will need replenishing approximately two-hourly night and day to maintain an even temperature. Electric blankets need most careful watching to keep the temperature at a correct level. Neither puppies nor kittens need feeding for some few hours after birth.

For the feeding of puppies of the larger breeds a premature baby's feeding bottle and teat is suitable, but for small breeds and kittens it is too large. Before the war it was possible to purchase dolls' feeding bottles with quite well made teats which served the purpose admirably, but it is now usually necessary to resort to a fountain-pen filler or similar type of pipette.

For the first three or four days feeding two-hourly night and day is desirable, but three-hourly feeds may be satisfactory in the case of really lusty puppies. After the fourth day three-hourly feeds should be continued until the whelps are 12 to 14 days old, when the periods between feeds may be gradually lengthened according to the demands of the puppies. From about 16 days the night feeds can be gradually reduced to one during the night and from about three and a half weeks it is usually possible to train the pups to go from about 11.30 p.m. to 7 a.m.

As each puppy is fed it should be cleaned up; massage of the perinaeum will provoke urination and defaecation in bitches, with massage of the prepuce in addition in the case of dogs; by this method it is possible to keep the whelps as clean as if the bitch were with them. In occasional cases washing and powdering may be necessary.

Under present conditions the only food likely to be obtainable is proprietary baby food which has gone out of date for infant feeding; to use such food not out of date is, of course, illegal. The food should be prepared as for infants, the full cream type being preferable if available. Kittens and small breed puppies may only take some 2 to 3 c.c. at each feed, while larger pups will take a large teaspoonful during the first few days. They should never be pressed to take more than they suck readily.

In normal times it is possible to use cow's or goat's milk as a basis and add sugar (or lactose) and butter to make up the correct proportions of carbohydrate and fat. This is rarely possible at present.

From the age of three weeks pups should be encouraged to lap from a saucer; their usual milk food or good quality concentrated beef tea are suitable. At three and a half to four weeks solids should be introduced in the form of scraped raw lean meat. At five weeks strong puppies and kittens should be almost self-supporting, taking alternate feeds of bread and milk or bread, broth and meat. Vitamin supplements may be added from about the third week, giving one of the concentrated forms of A and D, such as Adexolin liquid, or in the form of cod-liver oil together with an equal quantity of syr. ferri phos. co. to ensure adequate iron intake. Vitamin A is vital to young pups and kittens. Calcium intake should be assured by the addition of pulv. calc. lact. as soon as the pups are beginning to lap; it may be mixed in a milk feed.

Dependent upon the prevailing temperatures, artificial heat may be dispensed with from the third week onwards if the pups are strong and active; adequate bedding is necessary. By this time the pups should have been transferred to a box large enough to enable them to crawl about. The whole bottom of the box should be thickly covered with newspaper and the blanket bedding confined to one end, when the pups will quickly learn to avoid soiling the bedding by using the plain newspaper end. When it is not possible for them to be out of doors a large shallow sawdust box is very useful from four weeks onwards, for urination and defaecation.

Young puppies cannot stand sunlight, but from about four and a half weeks they may be put out for periods in the sun, but shade must be provided. By six weeks well-reared pups should be able to stand being put out in all reasonable weather to commence house-training. Hand-reared pups can usually be sent to their new owners between five and six weeks old; there is no advantage in keeping them longer if careful instructions are given regarding feeding at the time of disposal

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Correspondence

Epistaxis in Racehorses

Sir,—This condition, as we all know, can be very troublesome in both the racehorse and the hunter, and as is the case with the human subject (I have been a victim, so can speak from personal experience) the bleeding spot is rarely accessible. I have not found adrenalin of much value—possibly because of this—but I have had good results with the intravenous injection (5 c.c.) of haemoplastin (Parke, Davis & Co.), repeating at an interval of 12 to 24 hours if required. The animal is given restricted walking exercise and put on a course of calcium lactate (half to one ounce, daily, mixed in the food). If the bleeding spot can be located and touched, viper venom, or silver nitrate, applied, will stop it.

Yours faithfully,

J. F. D. Tutt.

"Rothiemurchus,"
St. Cross, Winchester.
June 14th, 1948.

Annual Congress at Southport, 1948

The following is the programme of the Association's Congress to be held in Southport from September 8th to 15th (inclusive). All meetings will take place in the Cambridge Hall, Lord Street, except where otherwise stated.

WEDNESDAY, SEPTEMBER 8TH

8.30 p.m. to 10 p.m. Reception by the Lancashire Division (Prince of Wales Hotel).

THURSDAY, SEPTEMBER 9TH

10 a.m. Opening of Congress by the Mayor of Southport (Councillor E. W. Raynor, J.P.).

10.30 a.m. Opening of Exhibition of Drugs and Surgical Instruments, etc., by President, N.V.M.A. (Victoria Hall).

11 a.m. Paper: "The Tuberculin Test." By T. Dalling, M.A., M.R.C.V.S. Openers of discussion: G. H. Arthur, M.V.SC., M.R.C.V.S., and J. McWilliam, M.R.C.V.S. Chairman: J. Holroyd, F.R.C.V.S., D.V.S.M. Recording Secretary: A. R. Jennings, B.V.SC., M.R.C.V.S.

3 p.m. Public address. "World Food and Agriculture." by Sir John Boyd Orr, D.S.O., M.C., LL.D., F.R.S., Chairman: Professor J. G. Wright, M.V.SC., F.R.C.V.S.

5 p.m. Meeting of Council (Town Hall).

8 p.m. Civic Reception (Floral Hall).

FRIDAY, SEPTEMBER 10TH

9.30 a.m. Coaches leave Southport for Liverpool University; welcome by Vice-Chancellor in the Arts Theatre at 10.30 a.m., followed by tour of the buildings and demonstrations in various departments. Luncheon in the Union, and then to "Leahurst," University of Liverpool Veterinary Field Station, for further demonstrations and tea. Excursions for Ladies to Liverpool and New Brighton, or to Liverpool and Chester.

8.30 p.m. President's Reception (Prince of Wales Hotel).

SATURDAY, SEPTEMBER 11TH

10 a.m. Annual General Meeting.

12.15 p.m. Congress Photograph (Floral Hall).

SUNDAY, SEPTEMBER 12TH

9 a.m. Excursion to Keswick via Windermere, including sail on Derwent Water.

MONDAY, SEPTEMBER 13TH

10 a.m. Paper: "Equine Accidents in the Fields of Sport." By Henry Sumner, M.R.C.V.S., D.V.H. Openers of discussion: E. Brayley Reynolds, O.B.E., M.R.C.V.S., and J. S. M. Cosgrove, M.R.C.V.S. Chairman: E. R. Callender, M.R.C.V.S. Recording Secretary: A. C. Shuttleworth, M.V.SC., F.R.C.V.S.

10 a.m. Annual General Meeting Ladies' Guild (Town Hall).

2.30 p.m. Paper: "The Present Situation with regard to Food Inspection in England and Wales." By Horace Thornton, B.V.SC., M.R.C.V.S., D.V.H. Openers of discussion: Colonel Harold E. Egan, U.S. Army Veterinary Corps, and Dr. K. Seidel, Deputy Veterinary Chief of the Health Committee, Copenhagen. Chairman: H. T. Matthews, B.V.SC., F.R.C.V.S., D.V.H. Recording Secretary: William Tweed, F.R.C.V.S., D.V.S.M.

7.30 p.m. for 8 p.m. Annual Dinner (Prince of Wales Hotel).

TUESDAY, SEPTEMBER 14TH

9.30 a.m. Paper: "Avian Salmonellosis." By J. E. Wilson, B.SC., M.R.C.V.S., F.R.S.E. Opener of discussion: R. F. Gordon, D.SC., M.R.C.V.S. Chairman: G. O. Davies, D.V.SC., M.R.C.V.S., D.V.H. Recording Secretary: J. C. Baird, B.V.SC., M.R.C.V.S.

10.30 a.m. Excursion for Ladies to the Wirral Peninsula; or Tennis Tournament in Southport.

11 a.m. Paper: "Observations on Canine Encephalitis." By A. B. MacIntyre, M.R.C.V.S., J. W. Trevan, M.B., B.S., B.SC., F.R.C.P, F.R.S., and R. F. Montgomerie, PH.D., B.SC., F.R.C.V.S. Opener of discussion: L. P. Pugh, B.SC., F.R.C.V.S. Chairman: D. D. Ogilvie, B.SC., M.R.C.V.S. Recording Secretary: Miss Mary Dalby, M.R.C.V.S.

2.30 p.m. Divisional (Sectional) Meetings.

Afternoon Women's Golf Competition and Men's Golf Competition.

8.30 p.m. Ladies' Veterinary Benevolent Guild Dance (Prince of Wales Hotel).

WEDNESDAY, SEPTEMBER 15TH

10 a.m. Closing Meeting.

11.30 a.m. Council Meeting.

12 noon Coaches leave for the visit to Evans Biological Institute, Runcorn.

SCIENTIFIC EXHIBITION.—There will be a Scientific Exhibition in the Cambridge Hall during the period of Congress which will include the following:—

By E. L. TAYLOR, D.V.SC., M.R.C.V.S., D.V.H. Displays on (*a*) The Snail and its Association with Liver Fluke; (*b*) The Efficacy of D.D.T. and Gamexane.

By JOHN FRANCIS, B.SC., M.R.C.V.S., and J. T. STAMP, B.SC., M.R.C.V.S. Joint exhibition on the Pathogenesis and Epidemiology of Bovine Tuberculosis.

By JOHN FRANCIS, B.SC., M.R.C.V.S. Exhibition of Graphs illustrating the Behaviour of the Sulphonamides in Domestic Animals and Methods of Control of *Str. agalactiae* infection.

By A. B. MACINTYRE, M.R.C.V.S., J. W. TREVAN, M.B., B.S., B.SC., F.R.C.P., F.R.S., and R. E. MONTGOMERIE, PH.D., B.SC., F.R.C.V.S. Specimens relating to Canine Encephalitis.

By the VICTOR X-RAY CORPORATION. Demonstration of X-ray apparatus and technique, and of interesting films loaned by G. C. Knight, M.R.C.V.S., A. C. Shuttleworth, M.V.SC., F.R.C.V.S., and E. Brayley Reynolds, O.B.E., M.R.C.V.S., and others.

QUESTIONS IN PARLIAMENT

Veterinary Science Courses (Candidates)

Mr. Philips Price asked the Minister of Agriculture whether he is aware that ex-Servicemen with matriculation standard are unable to enter for training in the faculties of veterinary science at the universities; and whether priorities will be arranged for this class of applicant.

Mr. T. Williams: Institutions offering degree courses in veterinary science have agreed to reserve not less than 80 per cent. of places for the academic year beginning in October, 1948, for people who served in the Armed Forces during the war or, in certain circumstances, in the mines or in agriculture; but the selection of candidates is of course entirely at their discretion.

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Contagious Abortion (Vaccine)

Mr. Viant asked the Minister of Agriculture how long the strain 19 vaccine has been in use as a preventive of contagious abortion; and what decline has been recorded in the incidence of the disease since its introduction.

Mr. T. Williams: For six years. Bovine contagious abortion is not a notifiable disease and there are no comparative statistics of its incidence before and since 1942. Strain 19 vaccine has, however, proved itself to be an excellent immunising agent against the disease.

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Mastitis (Research)

Mr. Randall asked the Lord President of the Council what is the amount now being spent on research for prevention of mastitis; and what progress has so far been recorded.

Mr. H. Morrison: Research on mastitis is being actively pursued at nearly all the State-aided institutions concerned with the study of animal diseases or dairy research, as a part of their normal programmes of work; but it is not possible to state what proportion of the maintenance grants made to these institutions relates solely to research on this specific problem. Much assistance is also given by the Veterinary Investigational staff of the Ministry of Agriculture and Fisheries in field trials with therapeutic substances, specially penicillin. In addition, the Agricultural Research Council have made a number of special research grants to institutions for the study of particular aspects of the disease, amounting, during the current year, to £6,500. Other grants have been made in respect of more general bacteriological research having a bearing on this problem.

The whole of the mastitis research, which is supported by State aid, is under the co-ordination of a special technical committee of the Agricultural Research Council set up for the purpose. A comprehensive report on the progress of the investigations, under the general oversight of this technical committee, is in course of preparation.

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Witnesses' Allowances

Sir E. Graham-Little asked the Secretary of State for the Home Department what action he proposes to take to revise the present inadequate allowances payable to professional witnesses in criminal courts in the light of the recommendations of the Departmental Committee on the Witnesses Allowances Order, published in February, 1947; and when this review will be brought into effect.

Mr. Ede: The amounts payable under the existing Witnesses' Allowances Order are at present being reviewed in the light of the report of the Departmental Committee referred to by the hon. Member, and I hope that it will be possible to make an amending order within the next few weeks.

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State Forests (Rare Birds and Mammals)

Earl Winterton asked the Minister of Agriculture if he will take steps to have the following birds and mammals: golden eagles, buzzards, kites, wild cats, polecats and martens, preserved in State forests in those parts of the United Kingdom in which any of the various species are found, in view of the fact that most of them are rare in Britain and none of them is inimical to the interests of forestry.

Mr. T. Williams: There is a standing instruction on those lines throughout Great Britain.

Mr Skeffington-Lodge: Does the Minister realise that although cats feature rather prominently in the noble Lord's Question, this is not a party matter, and will my hon. Friend consider adding badgers to the list of animals to be preserved?

Mr. Emrys Hughes: Is the Minister aware that farmers in Scotland do not want polecats or wild cats anywhere in the neighbourhood of sheep or lambs, and will he give an assurance that they will not be encouraged in Scotland?

Mr. Williams: The setting of traps for polecats is illegal throughout Great Britain and users are liable to prosecution.

NOTES AND NEWS

Diary of Events

June 30th.—July 2nd.—Meetings of Council and Committees, N.V.M.A., in the Royal (Dick) Veterinary College, Edinburgh.

July 2nd.—Annual Meeting of the Southern Counties Division, N.V.M.A., at Winchester (Cadena Restaurant), 3 p.m.

July 15th.—Social Outing of Dumfries and Galloway V.M.A., George Hotel, Penrith, 11.45 a.m.

July 19th.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1.

Sept. 8th to 15th (inclusive).—N.V.M.A. Congress at Southport.

Sept. 11th-13th.—Annual Meeting and Dinner of the Royal (Dick) Veterinary College, Alumnus Association at Southport (Prince of Wales Hotel), 7.30 p.m.

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N.V.M.A. Congress at Southport

With this issue we include the ticket application form and particulars of the arrangements for social and other events at Southport.

Members are asked to apply early and not later than July 31st, 1948.

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PERSONAL

Births.—Brown.—On May 26th, 1948, to Norma, wife of Colin C. B. Brown, Veterinary Officer, Tanganyika Territory, a daughter.

Dyke.—On June 11th, 1948, at Wellesley Nursing Home, Walmer, to Pam, wife of John Dyke, a daughter—Rosemary Claire (sister for Robin).

Wickens.—On June 10th, 1948, at Tonbridge Nursing Home, to Mary (*née* Wheat), wife of John T. Wickens, M.R.C.V.S., of Cage Farm Lodge, Tonbridge—a daughter, Carolyn Rosemary.

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Tsetse Research in Africa

A recent editorial (May 10th, 1948) in the *Rhodesian Herald* discusses a letter from a correspondent who refers critically to a declaration made by the Under-Secretary of State for the Colonies (Mr. Rees-Williams). When visiting East Africa he is stated to have said: "I have told the tsetse research people that I want a solution of the tsetse fly problem in two years, not in 25 or 30," adding that there had been too much lethargy in the past with the result that the fly was not being beaten.

It is not clear in whose ranks Mr. Rees-Williams felt the lethargy to have existed and whether the fault lay with the research workers or with the administration, but as the *Rhodesian Herald's* correspondent suggests, Mr. Rees-Williams does not appear fully to appreciate the magnitude of the problem which he wishes to be solved in a period of two years.

It is, however, gratifying that such an important Minister has taken such a close interest in this great African problem. A great deal of good work on tsetse fly control has been done and in certain instances spectacular results have been obtained. The effects of this pest are far-reaching and matters that require investigation with the aim of achieving its extermination involve incursion into wide ecological questions and deeply involved social conditions. Many branches of science require to play their part in the struggle to beat this enemy. Apart from the entomologists in their studies of the insect, the foresters, agriculturists and others with regard to the vegetation that aids or hinders the existence of the fly and the chemists with their contributions on parasiticides, the veterinarian, the medical man, the economist, the administrator and others have important roles to play.

The *Rhodesian Herald* is fully alive to the enormous importance of the tsetse problem and emphasises that difficulties in the past have been referable in the main to lack of finance and to lack of co-ordination between those engaged in the work in the various countries in Africa.

The key to the path of success is money. It has been estimated that some 3,500,000 square miles of tropical and subtropical Africa are infested or menaced by the tsetse fly and much of it is in territories other than those of the British Commonwealth. It is suggested that the problem is one for international co-ordination and finance, presumably based on the system adopted in the past

by the League of Nations. The actual lines of research to be followed are a matter for discussion. There is divergence of opinion among the experts concerning what are the most promising means to be adopted.

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INCREASE IN X-RAY PENETRATION

The electronics group of the Ministry of Supply's Atomic Energy Research Establishment, who operated the world's first synchroton in 1946, has now made a larger machine, producing 30 m. volt X-rays. The synchrotron is a new form of machine for accelerating electrons or nuclear particles to very high speeds. The present machine accelerates electrons until they are travelling so rapidly that their mass increases to 60 times its normal value.

The new synchrotron has been developed for two main purposes; first as a model to provide information for the design of the very high energy machines now being constructed in Britain, and secondly, to produce X-rays that are so penetrating that they should make it possible to treat malignant tumours deeply seated within the human body, and at present not easily accessible to external radiation. Machines are already being constructed to enable the Medical Research Council to experiment with these penetrating rays, but it will be some time yet before the medical potentialities of the rays are fully investigated.

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R.C.V.S. CENTRAL LIBRARY FOR ANIMAL DISEASES

Accessions for Quarter ending May, 1948

PRESENTATIONS

Books

Barclay, A. E., and others: The foetal circulation and cardio-vascular system and the changes that they undergo at birth. Blackwell, Oxford. (1944.) Presented by J. F. D. Tutt, Esq., F.R.C.V.S.

Barcroft, Sir J.: Researches on pre-natal life, Vol. 1. Blackwell, Oxford. (1946.) Presented by J. F. D. Tutt, Esq., F.R.C.V.S.

Ferrier, A. J.: The care and management of elephants in Burma. Steel Bros. & Co., London, n.d. (1947?)

Fitzgerald, B. Vesey-: The book of the dog. Nicholson & Watson, London. (1948.) Presented by J. F. D. Tutt, Esq., F.R.C.V.S.

Hamilton, W. J., and others: Human embryology (pré-natal development of form and function). Heffer, Cambridge. (1945.) Presented by J. F. D. Tutt, Esq., F.R.C.V.S.

Pullinger, E. J.: The provision of a safe and satisfactory milk supply on a national basis, with special reference to South African conditions. Pretoria. (1948.) (Typescript.) Presented by the author.

Trueta, J., and others: Studies of the renal circulation. Blackwell, Oxford. (1947.) Presented by J. F. D. Tutt, Esq., F.R.C.V.S.

Wentworth, Lady: The authentic Arabic horse. Allen & Unwin, London. (1945.) Presented by J. F. D. Tutt, Esq., F.R.C.V.S.

Edwards, J. T., and others: Phenothiazine in veterinary medicine: a review of the literature 1942-46. I.A.B. Joint Publication No. 12, 1947.

A collection of books and journals presented by Dr. Hare, M.D., CH.B., B.V.SC., M.R.C.V.S., D.V.H.

Reports.—10, Pamphlets and Reprints 69.

PURCHASES

Aslib: Report of proceedings of the 22nd conference, 1947. Aslib, London. (1948.) 3s.

Agriculture, Ministry of: Development of the poultry industry in North America. Agriculture Overseas Report No. 6. H.M.S.O., London. (1947.) 1s. 6d.

Agriculture, Ministry of: Edible and poisonous fungi; Bulletin No. 23. H.M.S.O., London. (1947.) 5s.

Hutyra, F., and others: Special pathology and therapeutics of the diseases of domestic animals. 5th English edition, edited by J. R. Greig and others, 3 vols. Baillière, Tindall & Cox, London. (1946.) 7 gns.

Ireland, Northern: Report of Select Committee on the slaughter of young calves. H.M.S.O., Belfast. (1948.) 5s.

Mackie, T. J., and McCartney, J. G.: Handbook of practical bacteriology, 8th edition. Livingstone, Edinburgh. (1948.) 25s.

Marshall, F. H. A., and Hammond, J.: Fertility and animal breeding, 6th edition. Ministry of Agriculture Bulletin No. 39, H.M.S.O., London. (1947.) 1s. 3d.

Nutrition Abstracts and Reviews: Author and subject, index, Vols. 1-5 (1931-36). 3 gns.

Steinhaus, E. A.: Insect microbiology. Constable, London. (1947.) 45s.

Worden, E. N., ed.: The UFAW handbook on the care and management of laboratory animals. Ballière, Tindall & Cox, London. (1947.) 31s. 6d.

ROYAL ARMY VETERINARY CORPS

The annual dinner of the Royal Army Veterinary Corps Officers' Club was held at Grosvenor House on Friday, June 11th. General Sir Sidney Kirkman was the guest of the evening and Brigadier J. J. Plunkett presided. Fifty-nine officers attended.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

SWINE FEVER:

Gloucester.—Stapleton Institution, Snowden Road, Fishponds, Bristol (June 16th).

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FOOD POISONING ON THE INCREASE

Mr. W. G. Pyatt, Chief Sanitary Inspector for Cardiff, said at the annual conference of the Sanitary Inspectors' Association, recently held at Cardiff, that cases of food poisoning were on the increase. The reasons generally attributed were the increase in communal feeding habits, coupled with the large proportion of made-up dishes supplied because of the smallness of the meat ration. It was also probable that many more cases of food poisoning were notified than hitherto.

It had been estimated, said Mr. Pyatt, that three out of four cases could be prevented if handlers of food would wash their hands. He suggested that the Ministry of Food should set up a permanent committee to advise on all public health matters relating to the handling, preparation and distribution of food.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the N.V.M.A.

Correspondents are requested to write as briefly as possible

THE VETERINARY SURGEONS BILL

SIR,—Apparently the recent correspondence on the subject of the Veterinary Surgeons Bill has served a useful purpose. It seems to have roused the Council from their stupor sufficiently to enable them to register a belated objection to the use of the title "Veterinary Practitioner" by quacks.

Having achieved this, I suppose we who objected to the action of Council, should be content. I still feel, however, that their abject surrender to pressure should not be allowed to pass unmarked and I suggest that a strong vote of censure should be recorded by the profession on their weak-kneed action.

Yours faithfully,

F. J. KINGHORN.

Moss House,
Scotland Lane,
Horsforth, Leeds.
June 15th, 1948.

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SIR,—I understand that the Government is desirous of safeguarding the livelihood of about 500 persons, who though not qualified, have derived their main source of income from treating animals. Surely there is no need to call them "Veterinary Practitioner" or "Animal Practitioner." In the case of the Dentists Bill many quack persons were enrolled on the register and called dentists, but in this instance each had to pass a rigorous entrance examination, although the work consisted merely of extracting teeth and making dentures. They still are not permitted to give a general anaesthetic.

Quack "Veterinary Surgeons" are in an entirely different category, for they have to deal with the prevention and treatment of all animal diseases. These persons have received no recognised teaching by veterinary surgeons and have no need to pass any entrance examination before enrolment.

In fairness to qualified members of the profession and in order that the public may not be misled, why not permit these persons to put on their nameplate—"REGISTERED TO TREAT ANIMAL DISEASES."

Yours faithfully,

C. WENTWORTH ELAM.

Veterinary Establishment,
8, Roscommon Street,
Liverpool, 5.
June 18th, 1948.